

ABSTRACT OF THE DISCLOSURE

A method of forming diamond crystals and diamond films includes subjecting a precursor having at least one carbon containing compound to a plasma generated by electromagnetic energy under conditions effective to disassociate the precursor and deposit the radicals formed therefrom. The precursor further includes a solution of methanol and at least one carbon containing compound. The carbon containing compound has a carbon to oxygen ratio greater than one. An electromagnetic discharge is applied to dissociate the vapor of the premixed solution and generate oxidizing and etching radicals such as OH, O, H as well as carbon depositing radicals such as CH₃. Graphitic and amorphous carbon deposition is suppressed or preferentially etched resulting in the net deposition of diamond crystals and diamond films.